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well as in *Sorosphaera*, amoebae are carried into new cells by the division of the infected host cell as described above for *Spongospora*.

Ligniera radicalis develops in the root hairs and cortical parenchyma of the roots of *Callitriche stagnalis*. As stated in the former paper, a true schizogenous phase is lacking. As in *Tetramyxa*, cell division does not accompany nuclear division during the growth of the organism. The chromidial stage occurs here as usual before the meiotic divisions. The first of these divisions often occurs before the plasmodium has broken up, but in such cases the plasmodium breaks up into "energids" during the second mitosis in such a way that the four nuclei resulting from the two mitoses are inclosed in the protoplasmic masses, which break up into four spores. The mode of development of *L. Junci* and *L. verrucosa* is similar to that of *L. radicalis*.

Molliardia is described as a new genus to include *Tetramyxa Triglochinis* Molliard. This form is peculiar in producing no spores on the host plant. The infected cells contain plasmodia which soon break up into uninucleate schizonts. These become 2–8-nucleate and break up anew. The full life history of this form is not known. In conclusion, the author adds some observations on the affinities of the Plasmodiophoraceae. He is inclined to regard them as being more closely related to such forms as *Rhizomyxa* and *Woronina* among the Chytridiales than to the Myxomycetes.—H. HASSELBRING.

The Grigna mountains.—The Grigna group of mountains includes some 60 square miles of mountainous country in northern Italy, adjoining the eastern shores of Lake Como and the connecting Lake Lecco. Its phytogeographical description by GEILINGERE[22] has an additional American interest because of the location of the region near the main route of American tourist travel. Notwithstanding its small area, the elevation varies from 199 meters at Lake Como to 2,410 meters on the highest of the peaks. This permits a wide range in climate, which is of course reflected in the vegetation. The Mediterranean province does not reach so far north, but many species of Mediterranean origin are present, and the olive extends to a maximum altitude of 490 meters. Most of the area is comprised within the submontane region, with forests of oak, hop hornbeam, and chestnut extending up to 1050 meters. From this elevation to 1650 meters the montane beech forests dominate. These in turn are succeeded by the subalpine forests of larch as far as 1950 meters, above which is the treeless alpine region. For all of these regions the author distinguishes ecological groups with a detail seldom approached in America. He recognizes seven chief types of vegetation, including forest, bush-forest, perennial herbs, grassland, swamps, aquatic vegetation, and rock vegetation. These are subdivided into formational groups, formations, and societies, of successively minor importance. This classification is based primarily upon physiognomy, and only secondarily upon environment or floristic composition. It is doubtful whether such a method can ever give entirely satisfactory results, although the author considers it the best for this region, where all the associations show the effect of cultural changes. Probably the gravest defect of the paper is the entire failure of the author to discuss the dynamics of the vegetation. The development of the various associations and their successional relations are omitted completely. Illustrations would have added greatly to the clearness of the descriptions, and the scale of the accompanying map would have easily permitted the location of the chief types of vegetation. Almost half of the lengthy article is occupied by a carefully annotated list of species.—H. A. GLEASON.

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[22] GEILINGERE, G., Die Grignagruppe am Comersee. Bot. Centralbl. **24**^{2}: 119–420. 1909.

Gametophytes and embryo of Pseudolarix.—MIYAKE and YASUI[23] have investigated the monotypic *Pseudolarix* (*P. Kaempferi*), a native of China, one of the Abietineae whose morphology had not been studied. The material was obtained from a tree growing in a garden in Pallanza, Italy. The winged pollen grains contained the usual cells of the male gametophyte, and the divisions showed 12 chromosomes, but the later development of the gametophyte was not seen. Megaspore formation was observed, a linear tetrad being formed about the time of pollination (April in Italy). The large central vacuole is formed in the spore stage (before free nuclear division), and the young female gametophyte is invested by several layers of nutritive cells. At maturity, the megaspore membrane is well developed, as in other Abietineae. Early in June the female gametophyte is solid tissue, and then the 5 or 6 archegonium initials appear, the archegonia maturing in about three weeks. After the division of the central cell, the ventral canal cell disorganizes at once. Fertilization occurs about the end of June, and the first four free nuclei of the proembryo move to the base of the egg, walls appearing with the next division. The cells of each tier divide, and the completed proembryo consists of four tiers, with four cells in each tier. The functions of the tiers are as in *Pinus*, and the whole situation seems to be an almost exact duplication of that genus.—J. M. C.

A cedar bog in Ohio.—DACHNOWSKI[24] records, as an isolated area of northern plants, left behind in the great northward migrations following upon the retreat of the ice sheet of the glacial period, a swamp in central Ohio, characterized by *Thuja occidentalis* and other species not usually found south of central Michigan. Mats of sphagnum, together with the sundew and various orchids, testify to the true bog character of the association.—GEO. D. FULLER.

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[23] MIKAYI, KÜCHI, and YASUI, KONO, On the gametophytes and embryo of *Pseudolarix*. Ann. Botany **25**:639–647. *pl. 48*. 1911.

[24] DACHNOWSKI, ALFRED, A cedar bog in central Ohio. Ohio Naturalist **11**:193–199. 1911.